



## Just the Facts...

### Southern Tick-Associated Rash Illness (STARI)

#### Q. What is STARI?

A. Southern tick-associated rash illness (STARI) is the name that the Centers for Disease Control and Prevention (CDC) has given to a newly recognized tick-transmitted disease that produces a rash similar to, and often indistinguishable from, the rash caused by Lyme disease (erythema migrans). STARI occurs primarily in the southeastern and south-central United States and is sometimes referred to as "Lyme-like illness." STARI is not yet well-defined.

#### Q. How does a person get STARI?

A. Unlike Lyme disease, which is transmitted by the bite of *Ixodes scapularis* (blacklegged tick, also known as the "deer tick"), STARI is associated with the bite of the lone star tick, *Amblyomma americanum*. The lone star tick is common in the southeast and south-central United States, the same geographic location where most cases of STARI occur. Spiral-shaped bacteria known as spirochetes have been detected in a small percentage (1-5%) of the *A. americanum* ticks collected from this region. DNA analysis of the spirochetes has indicated that they are not *Borrelia burgdorferi*, the agent of Lyme disease, but are a different, newly recognized species, *Borrelia lonestari*. You may get STARI if you are bitten by a lone star tick that is infected with *B. lonestari*.

#### Q. Is there any compelling evidence that *B. lonestari* causes STARI or that lone star ticks transmit it?

A. In 2001, a patient from New York developed a rash indistinguishable from erythema migrans (the hallmark rash of Lyme disease) at the site of a lone star tick bite. The patient had been traveling in both Maryland and North Carolina prior to noticing the attached tick. Blood testing for Lyme disease was negative. DNA testing of both the tick and a biopsy of the rash showed evidence of *B. lonestari*. This is a strong indication that *B. lonestari* causes STARI, and that *A. americanum* is a capable vector (transmitter) of the pathogen.

#### Q. How prevalent is STARI?

A. The current incidence of STARI is unknown. A case definition has not yet been developed, so the disease is not nationally reportable. The CDC is continuing to study the illness in order to more clearly define it.

#### Q. What are the symptoms of STARI?

A. Persons experiencing an expanding red, ring-like rash with central clearing (erythema migrans) following the bite of a lone star tick, *Amblyomma americanum*, or following exposure to ticks even if there is not a known tick bite, especially those living or traveling in southeastern or south-central states, should see a physician. A mild illness characterized by symptoms such as fatigue, headache, stiff neck, and occasionally fever, or other generalized symptoms may accompany the rash.

#### Q. How is STARI diagnosed?

A. There is currently no specific diagnostic test for STARI. The CDC is interested in obtaining samples from patients who have suspected STARI so that further research can be conducted. Evidence to support a clinical suspicion of STARI include rash, other suggestive symptoms, recent travel history to the southeast or south-central United States, known lone star tick bite, activities they may have resulted in tick exposure, and diagnostic tests that rule out traditional Lyme disease. In addition, DNA tests of skin and/or blood specimens may be possible if submitted to the CDC.

#### Q. What is the treatment for STARI?

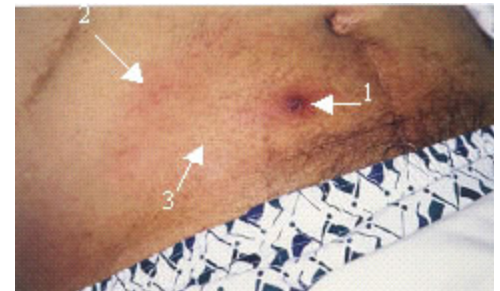
A. There are currently no specific recommendations for treating STARI. However, in most published case reports to date, the rash and other accompanying symptoms resolved quickly after the initiation of doxycycline therapy.



Adult female *Amblyomma americanum* tick. Note the distinctive white "lone star" spot, which is only present on the adult female. Neither the adult male, nor the immature life stages, have the spot.






*Amblyomma americanum* ticks are distributed throughout the southeastern quadrant of the United States. However, their range extends up the Atlantic coast as far north as Maine.




Presumptive index case of STARI, exhibiting erythema migrans rash: 1) site of tick bite, 2) red, ring-like, expanding edge of rash. 3) central clearing. (Photograph used with permission from the Journal of Infectious Diseases\*)

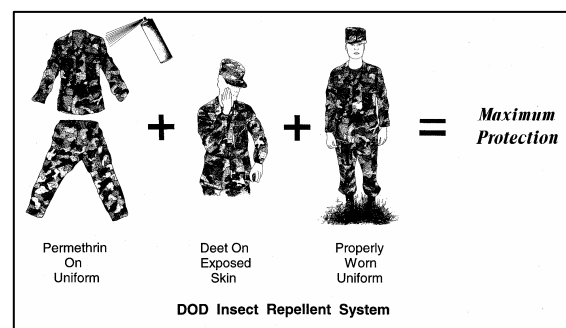
**Q. What can I do to reduce my risk of becoming infected with STARI?**

**A.** Help prevent STARI, and other tick-borne diseases, by protecting yourself from ticks. When in tick habitat (tall grass and weeds, scrubby areas, woods and leaf litter), follow these precautions:

-  Wear proper clothing as a physical barrier against ticks – long pants tucked into boots or tightly-woven socks; long sleeve shirt; shirt tucked into pants; and light-colored clothing so as to more easily spot ticks.
-  Check your skin and clothing periodically for ticks.
-  Use both skin and clothing repellents that have been approved by the Environmental Protection Agency (EPA). They are safe and effective.
  - For your skin, use a product that contains 20-50% **DEET** (N,N-diethyl-meta-toluamide). **DEET** in higher concentrations is no more effective.
  - Use **DEET** sparingly on children, and don't apply to their hands, which they often place in their eyes and mouths.
  - Apply **DEET** lightly and evenly to exposed skin; do not use underneath clothing. Avoid contact with eyes, lips, and broken or irritated skin.
  - To apply to your face, first dispense a small amount of **DEET** onto your hands and then carefully spread a thin layer.
  - Wash **DEET** off when your exposure to ticks, mosquitoes, and other arthropods ceases.
- For your clothing, use a product that contains **permethrin**. **Permethrin** is available commercially as 0.5% spray formulations.
- **Permethrin** should only be used on clothing, never on skin.
- When using any insect repellent, always FOLLOW LABEL DIRECTIONS.
- Do not inhale aerosol formulations.

•  For optimum protection, soldiers should utilize the **DOD INSECT REPELLENT SYSTEM**. In addition to proper wear of the battle dress uniform (BDUs)(pants tucked into boots, sleeves down, undershirt tucked into pants), this system includes the concurrent use of both skin and clothing repellents:

- Standard military skin repellent: 33% **DEET** lotion, long-acting formulation, one application lasts up to 12 hours, **NSN 6840-01-284-3982**.
- Standard military clothing repellents, either: aerosol spray, 0.5% **permethrin**, one application lasts through 5-6 washes, **NSN 6840-01-278-1336**; or impregnation kit, 40% **permethrin**, one application lasts the life of the uniform (at least 50 washes), **NSN 6840-01-345-0237**.



•  Groom pets well to prevent ticks from being carried into the home.

**Q. What should I do if I find a tick attached to my skin?**

**A.** Remove attached ticks as soon as they are found. Use tweezers to firmly grasp the tick's mouthparts up against the skin, and pull back firmly and steadily. Be patient – the tick's central mouthpart called the hypostome is covered with sharp barbs, sometimes making removal difficult. Don't pull back sharply, as this may tear the mouthparts from the body, leaving them embedded in the skin. If the mouthparts do break off, don't panic – the mouthparts alone cannot transmit disease because the infective body of the tick is no longer attached. However, to prevent secondary infection, remove the mouthparts as you would a splinter. Never squeeze the body of the tick or use such things as petroleum jelly, fingernail polish remover, or a lighted match: these methods could force more infective fluid into the skin. After removal, wash the wound site, and apply an antiseptic. Preserve the tick by placing it in a clean, dry jar, or other well-sealed container, and keeping it in your freezer. Should you develop disease symptoms, take the tick with you to the physician's office; identification of the tick species may assist the physician with your diagnosis and treatment. Discard the tick after a month; all known tick-borne diseases will generally display symptoms within this time period.

**Q. Where can I get more information on STARI and other types of tick-borne diseases?**

**A.** Contact the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). Additional information can also be obtained from your local, county, or state health departments, your health care provider, or the U.S. Centers for Disease Control and Prevention (CDC): <http://www.cdc.gov/ncidod/dvbid/stari/>

\*James AM, Liveris D, Wormser GP, et al. *Borrelia lonestari* infection after the bite by an *Amblyomma americanum* tick. J of Infect Dis. 2001; 83:1810-4.